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The Control of Growth Using Maleic Hydrazide

By J. C. SKINNER

Research at the Northern Sugar Experiment Station during 1954 has shown that maleic hydrazide can be used to delay flowering of sugar cane, and it also offers promise as a "chemical lawn mower."

Maleic hydrazide was dissolved in water and sprayed on small strips of the Station lawn which consisted of a good stand of Mackey's couch grass, *Chrysopogon acicularis* Trin. Concentrations of 0, 0.1, 0.2, 0.4, 0.8 and 1.6 per cent. were applied at the rate of 100 gallons per acre on January 27, 1954, soon after the beginning of the wet season.

All concentrations of maleic hydrazide

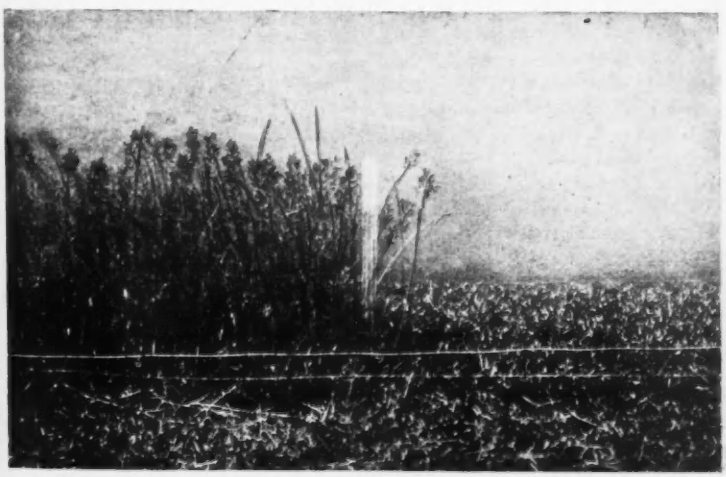

Fig. 19—This lawn has not been mown for 30 days. Plot on right was sprayed with 0.8 per cent. maleic hydrazide 30 days previously, whereas that on left was not treated. The section in the foreground was mown regularly.

had some effect, the effect increasing with each increase in concentration. Growth was slowed down and flowering was inhibited (Fig. 19). In areas where the grass was growing slowly at the time of application, 1.6 per cent. maleic hydrazide was quite effective for more than seven weeks, and the lawn remained attractive in appearance. Lower concentrations were effective for shorter times and growth was finally resumed in all treatments. In areas of lush growth the higher concentrations temporarily damaged the grass, the treatments were not effective for so long, and weeds were a problem. Regular mowing is one of the best ways of controlling lawn weeds and when mowing is discontinued weeds tend to crowd out the grass. In regions of lush growth maleic hydrazide is not a satisfactory alternative to regular mowing, but it might be so if weeds were simultaneously controlled by a contact spray of 2,4-D. In regions of slow growth high concentrations of maleic hydrazide can completely replace mowing for several weeks. In all areas it might be better to apply low concentrations (say 0.2 per cent.) and to mow the lawn less frequently than usual. The results are only of theoretical value at present because maleic hydrazide is not readily available in Australia. However, it may become more plentiful and cheaper in future.

In Queensland most sugar cane varieties flower in winter, but the early flowering varieties such as P.O.J.2725 finish before late varieties such as Badila begin flowering. This means that early and late flowering varieties cannot be crossed together unless something is done either to delay flowering of early varieties or to advance that of late varieties. Maleic hydrazide was tested to delay the arrowing of varieties which flower early in the season.

Arrowing was successfully delayed for several weeks (Fig. 20). Healthy flowers were present on treated plants after all untreated plants had finished flowering and these were used to make crosses which otherwise would not have been possible this year.

The time of application is very important. The earliest applications made in this year's experiments (10 to 12 weeks before flowering) using 1.0 per cent. maleic hydrazide were the most successful. Later applications also delayed flowering but the very late flowers were much damaged by the treatment. It will be necessary to do an additional experiment on time of application next year before maleic hydrazide can be used with complete confidence, but maleic hydrazide can now be accepted as a practical method of delaying flowering.

Fig. 20—The variety P.O.J.2725 showing (left) stools sprayed with 1.0 per cent. maleic hydrazide going up to flower, (right) plants sprayed with the 0.5 per cent. strength in various stages of flowering, and (centre background) untreated stools which have finished flowering.

We now use three methods to delay flowering:—(1) lopping the upper leaves two to three months before flowering; (2) subjecting the plants to artificial light at midnight about two months before flowering; and (3) spraying the upper leaves with 1.0 per cent. maleic hydrazide 10 to 12 weeks before flowering. Spraying with maleic hydrazide is less laborious than lopping and is more flexible than light treatment.

Opening of Lower Burdekin Experiment Station

On June 10, 1954, the Hon. H. H. Collins, Minister for Agriculture and Stock and Chairman of the Sugar Experiment Stations Board, officially opened the new Sugar Experiment Station in the Lower Burdekin district. This Station is the fourth in the sugar belt of the State and completes the chain which began with the first link at Mackay some 54 years ago. In 1900 the passing by legislation of The Sugar Experiment Stations Act made possible the establishment of the first of these experimental farms and, as the years passed, others were set up at Bundaberg, South Johnstone (later transferred to Meringa) and Ayr.

These Stations are the field centres of Bureau activity, the administrative centre being in Brisbane. A further experimental farm—not a full scale Experiment Station—also exists at Eight Mile Plains, near Brisbane; this is the focal point for the Bureau's disease investigations—work which cannot be conducted in a commercial cane growing area.

On the opening day at Ayr the ceremony took the form of a farmers' field day, and members of the staff guided groups of the growers around the Station blocks. The occasion was marred by light rain which made conditions uncomfortable, but despite this some 300 visitors took advantage of the first opportunity for a brief look at the Station work. Among visitors who had travelled from other parts of the State were noticed Messrs. A. F. Bell (Under Secretary for Agriculture and Stock), J. W. Inverarity and L. G. Scotney (members of the Sugar Experiment Stations Board), Dr. H. W. Kerr (Director of Research, Sugar Research Ltd.), Messrs. B. Foley and R. J. S. Muir (Queensland Cane Growers' Council), Mr. E. T. S. Pearce (General Secretary, Australian Sugar Producers' Association).

In his opening address, Mr. Collins stated that looking at the vast expanse of cane lands surrounding the station, it could be realised what the sugar industry meant to the north.

"Take the area from Bundaberg north, the sugar industry means all the difference between population and desolation," added the Minister.

Proceeding, the Minister said that all must be appreciative of the fact that they must develop lands on which to grow crops other than sugar cane. He was pleased to note that good progress had been made with experimental work on pastures with the aid of irrigation. This, it had to be admitted, was a practice which was associated with additional work and expense, but it represented concentrated pasturages. However, he was hopeful that, with the aid of research, a scheme will be evolved whereby good pastures will be raised without irrigation.

The sugar industry was a fortunate industry by the manner in which it was controlled and generally governed. It had a known market for a certain quantity of sugar, and possessed the means to keep production within that allowance.

There was never, in his opinion, a period where the industry enjoyed greater prosperity than the present, or that it was more assured of the future than it was at the present time. All sections were equally supporting the control of the great industry and also were behind the Bureau in the breeding of better cane varieties.

Mr. Collins considered that the day was unique in that they had at the gathering four persons who had been—one still was—directors of the Bureau. He was referring to Dr. Kerr, Messrs. Bell, Behne and King.

"I am doubtful," went on the Minister, "if any industry in the cane sugar world has improved to such an extent as Queensland. From what I have heard from visitors from overseas countries, Queensland is unsurpassed as regards efficiency in the sugar industry."

The Bureau of Sugar Experiment Stations had played a creditable part in

bringing such a state of affairs about, said Mr. Collins. This had been brought about by canes which had been raised by the Bureau, among which, S.J.16 had stood out as a great producer.

As a result of the work of scientists of the Bureau and other causes, the industry was now producing 50 per cent. more sugar per acre than 16 years ago.

Alluding to the remarkable expansion of the industry in recent years, Mr.

Fig. 21—A party of the Visitors at the Lower Burdekin Station grouped in front of the glasshouse.

Fig. 22—Past and present Directors of the Bureau at the official opening. Left to right: Dr. H. W. Kerr, Mr. E. R. Behne, Mr. A. F. Bell, and Mr. N. J. King.

Collins stated that two years ago the industry and those guiding its destinies were at their wits' end to know how to fill contractual obligations into which the industry had entered for the 1954-1955 season. Now it was a case of how consumers would be secured for the over-supply.

It was obvious, said the Minister, that the industry had to get back to its contractual obligations, but he was pleased to be able to state that the

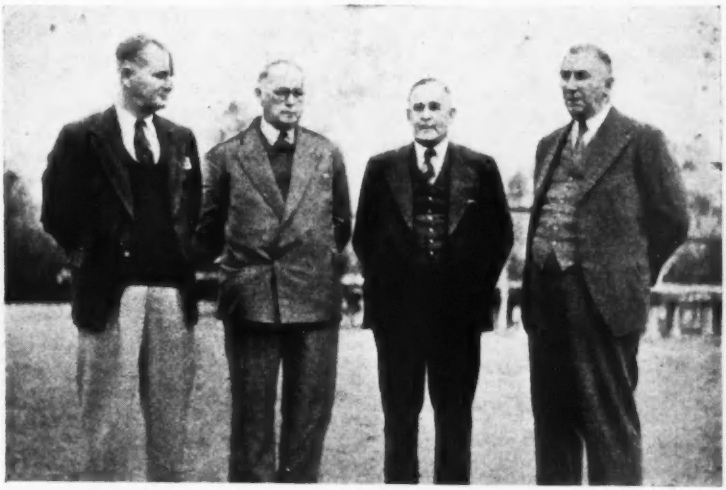

Fig. 23—The Sugar Experiment Stations Board. Left to right: Mr. A. F. Bell, Deputy Chairman; The Hon. H. H. Collins, Chairman; Mr. L. G. Scotney, and Mr. J. W. Inverarity industry members.

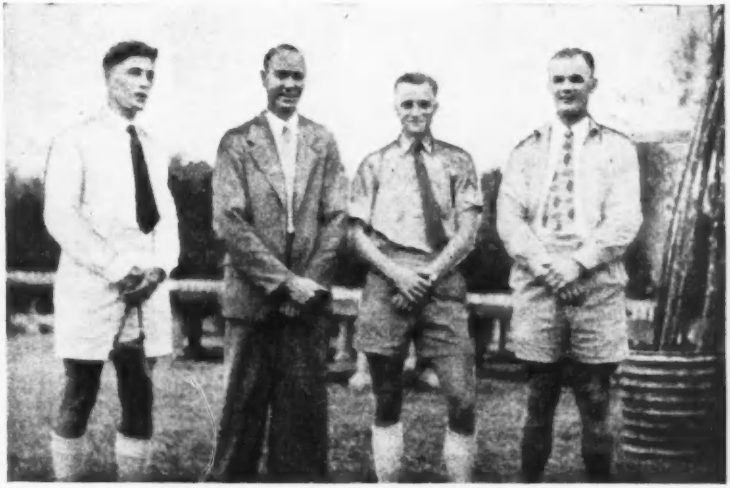

Fig. 24—The staff of the Experiment Station: Mr. J. Wesdorp, Asst. Agronomist; Mr. G. A. Christie, Senior Adviser; Mr. I. Freshwater, Cadet; and Mr. R. B. Moller, Adviser.

whole of the current season's crop would be acquired.

"I consider it is very wise to harvest the whole of the present year's crop," went on the Minister. "An over-supply year, such as the present one, can make up for some year when there will be under-supply. It was wise to harvest what has been grown this year, and then, if necessary, limit farm peaks."

In further reference to the marketing of the 1954-1955 crop, Mr. Collins said the Sugar Board had acquired the whole of it in its proclamation. The crop for the coming year would be greater than the market available in the current year, but the industry had indicated that it believed that there would be some carry-over from the good seasons.

The Minister added that the Government regarded provision of the necessary storage capacity as part of the normal responsibility of the milling section of the industry, and he expected that suitable arrangements would be made to deal with a crop of such magnitude under normal transport conditions. He would ask the Sugar Board to do its utmost to adjust removals so as to meet any unavoidable emergent circumstances.

Since 1949, said Mr. Collins, there had been an expanse of 60 per cent. in expansion in the sugar industry. This included the admission of 1,000 new growers and increased assignments to 4,000 old growers in order to bring them to a living wage. He trusted that living areas would be considered when farm peaks were framed.

The Minister expressed the hope that the usage of grass land would be just as efficient as sugar land.

In conclusion, Mr. Collins paid tribute to all those scientists who had been engaged in the industry.

In supporting the remarks of Mr. Collins, the Under-Secretary (Mr. Bell) stated that the present station, which had been so long in the planning, was now functioning.

The Bureau of Sugar Experiment Stations now had its headquarters in Brisbane, and had in addition four fully equipped sugar experiment stations, or two more than any overseas sugar cane producing country.

The most important function of the station, said Mr. Bell, would be the breeding of new varieties of cane which would be suitable to the Lower Burdekin. Last year the Budekin had averaged six tons of sugar per acre, which was a very good performance and second only to Hawaii.

In explaining what he referred to as increased efficiency, Mr. Bell said that the objective was to get a greater quantity of cane from a minimum area.

Mr. King's Address

In his address, the Director of the Bureau, Mr. N. J. King, said:—

"This Station is one of our more recent ventures. The land was purchased in 1948, the first cane was planted in 1950 and to-day you can see that it is well on the way to complete development as a strong unit in our chain. Land suitable for an Experiment Station was not easy to acquire and it was only through the good offices of Pioneer Sugar Co. that this property, portion of the company's grazing land, was sold to us. A good water supply was located, buildings and fencing were erected and an irrigation plant installed. We trust that in the future years the investigational work on this Station will be of as much value to this district's cane growers as it has been on our other properties."

"Despite the position which has recently arisen, whereby production may in some years exceed available markets, there is room for technical improvement in many phases of cane production. Modern sugar cane varieties are blamed to some extent for contributing to over production. It does not necessarily follow that no effort should be made to improve on them. There is still a place for special purpose varieties which have higher sugar content early in the season, varieties with a better water economy and which will require less intensive irrigation, varieties which will stand up better against strong winds and, perhaps, varieties

with lower fibre content to allow higher crushing rates. The Lower Burdekin growers have a good selection of varieties now but it could not be argued that they are the last word in production potential on these rich delta soils."

"The past years have witnessed the eradication of such major diseases as previously existed here; they have also seen the control of your only serious insect pest. The concerted attack on ratoon stunting disease, and the success achieved to date, augurs well for the future control of this recently discovered ailment. It is now undoubted that even more successful crops will be grown after the hot water treatment which cures this disease and another milestone will have been passed in the progress of the industry and its conquest of obstacles in its path."

"The function of this Station," said Mr. King, "is not only to produce new cane varieties and to control diseases and pests. Its work will include investigations of cultivation practices and of irrigation procedures. The Lower Burdekin area has always followed a practice peculiar to this area—the concentration on growing plant cane and an almost total disregard for the advantages of growing ratoons. As recently as the 1952 crop less than 40 per cent. of your harvested acreage was ratoons, whereas in the districts north of Townsville the ratoon acreage was over 60 per cent. This has always been difficult to understand, since it has been demonstrated conclusively in this area that ratoon crops can be highly successful and certainly more economic. The high costs of land preparation and planting severely curtail the nett profits from plant cane, but these are not a charge against a ratoon crop. The ratooning difficulties associated with such old varieties as B.208, Clark's Seedling, Oramboo and S.J.16 do not apply to Badila, Trojan and Pindar. We have already planted on this Station a long term trial which will attempt to assess the nett return from growing plant and ratoon cane of several varieties as against plant cane only: the information to be obtained should be of considerable value to the district growers."

Mr. King continued:—

"We are also beginning some work on irrigation procedure. It is essential that we find out primarily something of the moisture relationships of these Burdekin soils. We will determine the moisture holding capacities and find out at what moisture content cane growth slows down. It is also our aim to find out something of the water penetration during irrigation.

"By these means we can assess the optimum watering which should be applied and define the best length of row for economic watering. Irrigation water is not cheap in this district and any saving in pumping costs can have a big effect on farm economy. An agronomist has been appointed to this Station to carry out these investigations.

"We have, during the past few years, been working on the problem of weed control by chemical means. The pre-emergence use of 2,4-D is not so applicable to your farms as it is in other districts. This is due to the soil movement brought about by flowing irrigation water. But we are hopeful of assisting you in other ways. You have a particular problem here in controlling grasses and weeds in irrigation channels. The hand chipping method is costly and time consuming, flame throwers are dangerous where the channel is close to cane blocks and such chemicals as sodium chlorate constitute a fire hazard. We are now investigating the use of some boron compounds which are soil sterilants, and maybe the answer lies in the use of such materials.

"Although there has been no local Experiment Station until recently this district has benefited from our work in other areas. The control of pineapple disease has meant more here than in any other area, and the discovery of BHC as a grub control chemical has meant a considerable amount to Burdekin growers. S.J.16 has been a valuable variety to you although it was bred by the Bureau at South Johnstone. We are confident that our present seedling activities on this Station will result in better canes for the district in the future."

The Variety Q.28

By C. G. HUGHES

Q.28 is a seedling produced at Mackay Experiment Station from seed sown in 1935 from the cross Co.290 × Q.1098. It was given a bad reputation because of susceptibility to ratoon stunting disease, but recent work has shown that some other canes are just as susceptible and that there was no particular reason why Q.28 should be singled out for condemnation.

Q.28 first came to the attention of farmers in the Mackay district as a result of a series of Bureau trials in which it heavily outyielded the then standard canes, E.K.28, M.1900S, Q.813 and S.J.2. A summary of no less than five trials showed that in the plant crop Q.28 averaged 31.6 tons of cane per acre at 15.1 c.c.s. giving 4.77 tons of sugar per acre, while the standards with 20.9 tons at 15.77 gave 3.29 tons of sugar. In the ratoons Q.28 was even more outstanding and in a dry season yielded 24 tons at 15.5 to return 3.72 tons of sugar per acre, while the others averaged only 10.3 tons of cane per acre with a c.c.s. of 15.8 to return 1.63 tons of sugar. It is no wonder that such a cane was an instantaneous success and in the 1942 season not a ton of Q.28 was crushed at any Mackay mills so much was it in demand for plants. The next season saw a mere 2,409 tons put through the rollers in the Mackay district, but in 1944 111,023 tons were crushed yielding 10 per cent. of the district's cane and making it (after M.1900S, Co.290 and E.K.28) the fourth most important cane. Its rise after that was spectacular; in 1945 it yielded 29 per cent. of the Mackay crop to become the most important local cane and to fill fifth position in the State as a whole. The following year its yield of 439,038 tons placed it easily first in Mackay and made it the second most important cane in the State. Its peak tonnage at Mackay and its greatest percentage there came in 1948 season, when it produced 907,014 tons, and with 52.2 per cent. was easily the most important cane; its State position was then third, but it produced 14.1 per cent. of the total Queensland crop. In the meantime plantings of the variety Q.50 were being expanded and that combined with the incidence of ratoon stunting disease (which incidentally was first known as "Q.28 disease" owing to its discovery in that cane) led to a reduction in the acreage of Q.28 planted at Mackay. The tonnages of Q.28 and Q.50 were approximately equal in 1949 but in the following year Q.50 produced 64.4 per cent. of the Mackay crop and ran into second place in the State with 1,110,000 tons. There was a steady decline in Q.28 until in the 1952 season the variety yielded only 138,300 tons. It was still the second most important cane at Mackay with 7.8 per cent., but it had now dropped to eighth place in the State with only 2 per cent. In the same year Q.50 yielded 77.1 per cent. of the Mackay crop and 20.7 of the State as a whole.

Although the emphasis above has been on the Mackay district, Q.28 has also been tested in other areas. The peak of the extra Mackay production was reached in 1949, when over 68,000 tons were harvested. This included 25,000 tons at Moreton, 10,000 tons at Maryborough, and substantial amounts at all the other southern mills. The variety has not shown any promise for the northern mill areas. Its introduction and propagation in the southern mill areas was occurring at a time when investigations into ratoon stunting disease were bearing fruit and it was soon found that a good deal if not all of the planting material was diseased. Rather than run the risk of serious losses from the disease it was considered wise in view of the then rather limited knowledge of the disease that the variety should be abandoned and this year 1954 sees it remaining on the South Queensland approved lists for only Moreton and Rocky Point. It has had to be discarded in many areas without an

adequate test of disease-free stocks and it cannot be said that it has been abandoned on account of proved poor performance of superior performance of other varieties.

The variety Q.50 (like Q.28 also bred at the Mackay Experiment Station) is no doubt a very fine cane and a very profitable cane to grow, but it is felt that at present it occupies too large an area in the Mackay district. In general, if a variety is found to be eminently suited to a district there is no reason why it should not form a very large proportion of that district's crop; for instance, the preponderance of Badila at South Johnstone and Babinda has no doubt been to the advantage of these districts in view of their climatic and topographical features. Before one can approve of a variety occupying a high percentage of a district's cane lands, the premise must be made that the cane in question is absolutely safe from the disease angle, and it is this aspect which leads one to query the advisability of having too much Q.50 at Mackay, or in any other district for that matter. Q.50 is in general perfectly safe to grow and is commercially resistant to practically all common diseases of cane, but it is susceptible to red rot and that alone should lead to some caution when a farmer is planning his planting programme. Red rot normally does not appear in Q.50 until the last few weeks of the crushing but in adverse seasons may appear as early as September. When it does strike losses of c.c.s. are severe and attacked fields are frequently so low in sugar as to be condemned at the mill. Q.28 has much the same general resistance to diseases as Q.50, but in addition it is quite resistant to red rot and only in exceptional years does it become infected and suffer deterioration in quality.

Individual farmers have suffered considerable losses from red rot in Q.50 during the last four seasons since the variety has become established as the leading cane at Mackay, but even so conditions have not been favourable for the disease and the overall district loss has been fairly low. This should not, however, lull farmers into a sense of security for should a bad red-rot year appear there is no doubt that losses will be widespread and very heavy. The remedy of course is to harvest all Q.50 before red-rot infection is likely to occur and other varieties should be provided for the latter part of the season. Q.28 is very hard to beat for this purpose and all farmers whose properties are situated on the typical Mackay clay-bottomed soils should make a point of growing some of this variety. The same position with regard to Q.50 has not yet arisen in other districts, although in some places in South Queensland there is a tendency to plant too much of that cane on individual farms. There is no doubt that the variety has a future in the North, where it yielded 2.5 per cent. of the crop in 1952 and in S.Q. where in the same year it produced 10 per cent., and as it increases in popularity the danger of it being overplanted must be guarded against.

Q.28 is a very good cane from the agricultural aspect—it would never have risen in popularity so rapidly had it been otherwise—and now that stocks free from ratoon stunting disease are becoming available it should be reintroduced on to many Mackay farms and extended in the Southern districts, where it never had a fair trial. The variety strikes and ratoons rapidly and reliably and even heavy crops usually remain upright. It covers in fairly rapidly and is reasonably drought resistant. It is capable of splendid growth during the cooler weather providing the winter remains open. Its continued growth in late winter and early spring leads to a comparatively low sugar early in the season, but this improves later and is held for prolonged periods before any deterioration occurs. As mentioned before, its disease reactions are satisfactory for growth anywhere in Queensland and its known susceptibility to ratoon stunting disease can be easily overcome by the provision of healthy planting material.

Flood Damage to Standing Cane

By H. C. HASKEW

During the period 10-11-12th July there occurred cyclonic rains through a large portion of south-east Queensland. The centre of the disturbance was in the vicinity of Bundaberg and there were heavy falls of rain there as well as on the higher parts of the Burnett watershed.

The resultant flooding led to the inundation of some areas of low-lying river country and standing cane was partially or completely covered by the water. In addition there were several farms on which burnt and cut cane, lying on the ground, was covered and partially buried in depositions of silt. Some blocks of young growing cane, in which stooling had just commenced, were completely immersed for periods of two or three days. Fortunately there were few instances of the occurrence of washing of the water through either young or growing cane, but cane was flattened and covered with debris or silt where this did occur.

The most widespread damage that did occur was not actually physical damage but was a lowering of the value of the cane due to an anticipated increase in harvesting costs. The damage referred to is the adhering mud which was left clinging to the leaves, leaf sheaths and stems of the cane after the water had receded. It is possible that storm rain will wash out this mud before the cane has to be cut, but there is no guarantee that this will happen.

As soon as it became possible to travel to the affected blocks of cane a programme of sampling cane and analysing juice was instituted to ascertain whether the c.c.s. was adversely affected. This unseasonal flooding was the first that had occurred for 19 years and, as little was known of the reaction of cane to it, the need for an organized investigation of its effect on cane was apparent. Representative fields were selected from farms along the Rubyanna Road in which cane had been partially immersed, completely immersed or washed by moving water so that cane was lying down flat (but the sticks not broken at any point). Plant, ratoon and standover crops were included though each was not in all the preceding three classes. Six or eight stick samples were taken three times during the first week of sampling and then once per week for the next three weeks. The samples were crushed (tops and butts separately) on the small laboratory mill and juice analyses carried out. The figures for the analyses are contained in the accompanying table, which shows that there has been little or no effect on the cane as the result of the immersion. (While the small crushing mill figures are sufficiently accurate to show that nothing untoward has happened, a deduction of 1.5 units should be made to bring them into line with mill figures.)

Table of c.c.s. figures from experimental mill crushings of samples of cane flooded during the period 10-11-12 July, 1954

Variety	Crop	Degree of Immersion	Date of Sampling					
			19/7/54	21/7/54	23/7/54	30/7/54	6/8/54	13/8/54
Q.50 ..	Plant	Partial	15.24	15.49	15.22	15.20	15.04	15.23
Q.47 ..	3rd Rtn.	Complete	14.44	15.03	14.81	14.93	14.32	15.17
Q.49 ..	S.O.	Partial	14.07	13.98	14.72	14.58	13.67	14.26
Q.49 ..	S.O.	Complete	13.97	13.87	13.99	14.32	13.89	14.10
Pindar ..	Plant	Complete (and lying flat)	12.55	13.47	14.13	14.71	13.81	15.37

Progress

By J. H. BUZACOTT

But far above and far as sight endures
Like whips of anger
With lightning's danger
There runs the quick perspective of the future.

This dwarfs our emerald country by its trek
So tall with prophecy:
Dreaming of cities
Where often clouds shall lean their swan-white neck. —Stephen Spender

Towering over the canefields between Innisfail and Cairns are the tall structures bearing the transmission lines which will eventually convey power generated at the Tully Falls to link up with the Barron Falls hydro-electricity scheme and provide a great portion of far North Queensland with electrical services. The line runs in as straight a line as practicable from the generating site on the upper reaches of the Tully River through tropical rain forest over lush canefields of Innisfail, Babinda, Mulgrave and Hambledon and finally through swamps as it nears Cairns. Partly because of its direct route it does not parallel the road or railway line as do the existing electric and telephone lines; for safety reasons also the transmission line has been kept as far as possible from existing services as the new line is designed to carry the high pressure of 132,000 volts.

Farmers along the surveyed route are unfortunate in having to provide a right of way for the line with the result that very often a tower has been erected in the middle of a valuable canefield. Since the farmers concerned are expected to keep a distance of one chain round each tower clean it is obvious that such a structure has some nuisance value apart from the loss of cane which could have been grown on the site which it occupies. In some instances no less than four towers stand

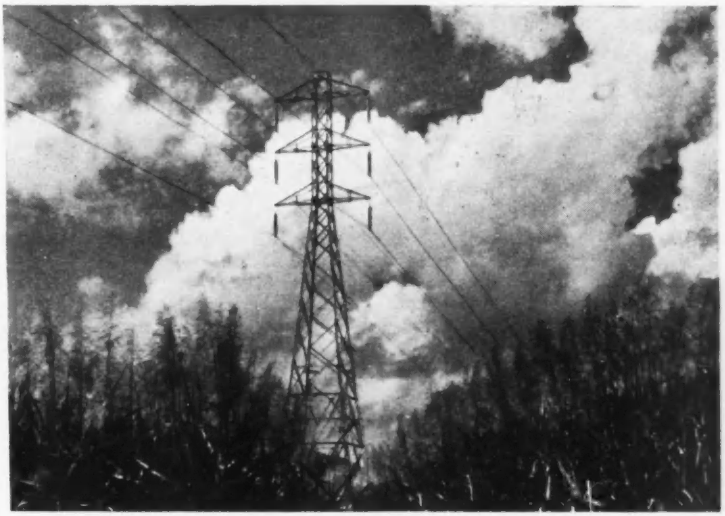

Fig. 25—Transporter tower on the Tully hydro-electricity transmission line.

within the confines of a single farm. It is possibly some compensation to the farmers concerned to know that iu putting up with the individual inconvenience they will enable many more homes and farms to be supplied with that valuable amenity of modern life, electricity.

Much conjecture has been heard regarding the size and height of the towers and most guesses are very wide

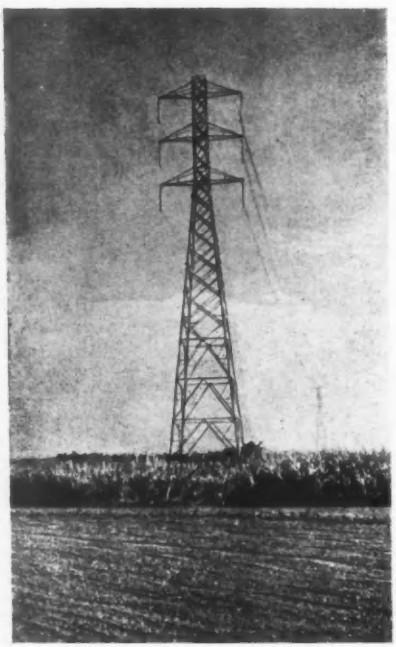

Fig. 26—Another view of the tower. Note others in the distance.

of the mark so that some details of the installation are not without interest. The towers vary in height according to the situation. They are constructed of galvanised angle-steel and the tallest are approximately 110 feet high, whilst the shortest are about 80 feet. The tall ones have a 16 foot square base. The towers are erected at an average interval of 1,000 feet. About 50 feet from the ground on the taller, and somewhat lower on the shorter ones, the structures are surrounded by sharp downward projecting spikes to prevent unauthorised persons from endangering their lives by climbing them. Seven wires are carried by the transporters, three on each side and one along the top centre. The cables have a steel core and are sheathed in aluminium. They have a sag of 20 feet at the centre of the span between transporter towers and are supposed to have a minimum clearance of 42 feet over sugar cane and 25 feet over other ground.

The towers and transmission lines were erected under contract by a European firm. Small mobile gangs of men were employed and the whole system was completed in a very short space of time. After the initial survey the first gang with a mechanical post hole digger sank four holes some seven feet deep at the corners of a sixteen foot square. The holes were opened up to two feet square and the next gang poured concrete into them to form blocks, the size of which was reduced to one foot square at the surface of the ground. The next gang erected the superstructure on these blocks to a height of some twelve feet, whilst the following gang completed the erection of the towers. Still another group strung the wiring, and the whole task was a triumph of organization.

When they were first erected the towers looked somewhat incongruous standing in the canefields, but now in the late afternoon sunlight their framework and gracefully looping wires glistening white against the dark green mountain background, they melt into a decorative landscape.

The Bureau's Senior Cane Breeder, Mr. J. H. Buzacott, will be making an official trip overseas in the new year. He will study advances in cane breeding and genetics in Taiwan, India, South Africa and Mauritius. It is expected that his absence from Australia will be about three months.

A New Cane-Killing Weed

By O. W. D. MYATT AND C. A. REHBEIN

In early August, 1953, reports of a new "cane-killing weed" were investigated in the Booyal area and the presence of a parasitic weed, causing considerable damage to growing cane, was confirmed. Specimens were forwarded to Head Office for identification.

Information since supplied by the Government Botanist has confirmed the parasitism of the weed and identified it as *Thesium australe*, a native plant common to many localities in the Moreton Bay, Dawson and Burnett River Districts. Species of Thesium are numerous in South Africa, but *Thesium australe* is the only one known in Australia. Authorities have difficulty in distinguishing it from some species found in other countries and it may be identical with them.

This plant is a perennial and grows actively during the cooler months, which is in marked contrast to the well known "cane-killing weed" *Striga sp.*, found from time to time in Queensland cane fields. This is the first recorded instance of the parasitism of *T. australe* in cane and the presence of the pale roots of the weed adhering to the cane roots are clearly visible in Figure 27.

The weed was first noticed in a two-acre cane field, both amongst the stools and in the interspaces; and where it occurred in the cane row the stool was either severely stunted or completely killed, depending on the vigour and proximity of the weed. The ratooning ability of the cane is also seriously reduced and the affected patches clearly visible in Figure 28 give some indication of the potential killing power of the weed.

Fig. 27—The parasite attaches itself to the roots of the cane crop.

During the spring months the weed grew to approximately 9 to 10 ft. in height with numerous, erect wiry branches of fairly even height arising

from a compact crown, and giving a general tufted appearance. Leaves are linear and alternate and are approximately one inch in length with the upper leaves shorter and more slender. Flowers are small and circular of approximately one-tenth inch diameter, white in colour and arising from the leaf base. Flowers are present only on the upper half of the stems and seed pods are small and globular.

Fig. 28—Cane killed in patches by *Thesium australe*.

Regrowth of the parasite was strong during the early spring months, but vigour lessened with the hotter months and by mid-December growth had ceased and "die back" was occurring. In contrast, the weed when first located during its winter growth period showed exceptional vigour with recumbent stalks up to three feet long covering the entire interspaces.

There are indications that some measure of control may be gained by cultivation, since the weed was only present in that portion of the cane block stood over from the 1952 harvest and in which no cultivation had occurred for approximately 14 months. Sprayings with 2,4-D and 2,4,5-T have given an apparent kill of the early spring growth, but the possibility of its re-shooting during the active growth period will be watched.

A survey of the Booyal area shows the weed to be present along roadsides and in adjoining paddocks, but as yet it appears to have made only a very limited encroachment on cane lands. However, the possibility of it assuming pest proportions in cane fields remains a constant threat and growers are advised to notify the nearest Field Officer should further weed spread be noticed.

Wild Canes in Captivity

In maintaining a collection of cane varieties for use in cane breeding one of the major difficulties consists of looking after the so-called "wild" relatives of sugar cane. These form a necessary part of such a collection as they are used extensively in breeding. The two species which present a problem are *robustum* and *spontaneum*. The former is very hard and has a very low sugar content. Although it forms large stools it does not become a serious pest and it is customary to plant it on the outside rows of the blocks of parent varieties. In this way when the blocks are harvested the cutters leave the outside rows of *robustum* standing. These are then cut down with brush hooks and the stalks stacked and burnt.

The *spontaneums* which also contain little or no sugar are a different proposition. These are grass-like and stoloniferous, which means that they form lateral prostrate stems at ground level which root and produce new plants with the result that the stools keep extending in all directions until at length large brakes are formed. Several times plantings of these *spontaneums* have got out of control in Queensland. At Meringa a clump of the large Burma *spontaneum* has to be continually reduced in size by ploughing and hand grubbing. This plot is shown in Fig. 29, in which it can be seen that the foliage is scorched by a recent poisoning campaign. At Freshwater a large expanse of the same variety has been, of recent months, consistently poisoned with a variety of weed killers in a vain attempt to eliminate it. There are also large areas near South Johnstone covered by glagah, a Javanese form of *spontaneum*.

Fig. 29—A clump of *S. spontaneum* growing at Meringa Station.

It is necessary to retain these types of *spontaneum* for breeding work, and other varieties of the species have recently been introduced, including three from New Guinea, one originating in Krakatau and another which is called gigas, on account of its large size, from

Sumatra. In order to keep them within bounds and to prevent them from in future becoming a pest all these *spontaneums* are now planted in concrete pens which have been recently constructed at Meringa. Figure 30 shows several *spontaneums* growing in these newly constructed pens. The variety on the left which is not so confined is not *spontaneum* but a related plant called *Miscanthus* which, although it forms large clumps, does not become a pest.—J.H.B.

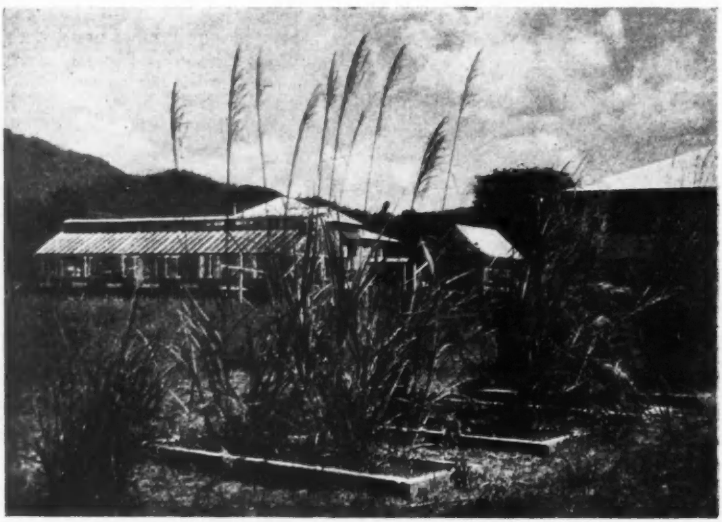

Fig. 30—Spontaneum cane varieties confined in concrete pens at Meringa.

Cane Holing

The recent expansion of the sugar industry has occurred in all districts of Queensland and over a wide range of climate and soil. Much of the clearing of the standing forest and scrub has been done by bulldozer and ripper and the fields have been planted and cultivated mechanically from the very first crop. It is rare therefore to find fields in which cane has been planted amongst the stumps and logs and other debris of a virgin scrub. This was, of course, the only method by which our first pioneers could obtain an early crop to provide expenses while the land was being properly cleared but this "cane holing," as it was called, is now so rare as to be worth recording for the information of a whole generation of farmers who would not know what it meant except through hearsay.

The field shown in the illustrations is part of a new farm recently cut out of the rain forest in the Eubanangee area between Babinda and Innisfail. The size of the original timber can be judged from the large stumps and logs remaining after felling and firing. The cane—Badila was the variety—was planted amongst them and when photographed was just starting to come away after the harvesting of the plant crop. The harvesting and pulling-out operations must have presented problems but the

farmer was not available at the time of the visit to give details of his difficulties.

The excellent structure of the new soil was shown well in its resistance to movement on these slopes in such a high rainfall area. There was no evidence whatever of gullying even though heavy showers, such as that showing against the scrub in the background were of frequent occurrence.

Cane-holed areas are very expensive to work and as soon as this planting runs its course the logs will be gathered about the stumps and fired and the next crop should be in clean land. It is fortunate that the big timber of this land is generally softwood since an entirely different problem would be posed were the trees ironbark, for instance, with its tremendous resistance to decay, its hardness and its weight.

—C.G.H.

Fig. 31—Cane-holed field ratooning at Eubenangee. This method of farm development is rarely seen to-day.

Fig. 32—Cane ratooning among logs and stumps at Eubenangee, 1954.

Molasses Plus Sulphate of Ammonia

By C. G. STORY

Canegrowers appreciate the beneficial effects of molasses on soils of poor physical condition, and those deficient in potash. A number of canegrowers regularly apply this material to blocks of cane following harvest of the plant crop; others would do so if the molasses were available.

Mills, which sell molasses for fertilizer at a reasonable price, establish a sound economic cycle which increases the production of the canegrowers' land and ensures the future production from this land, thus maintaining an assured crop for crushing. Benefits accrue to both mill and grower; it is one programme of long term planning which pays dividends. At least one mill in the Mackay district appreciates this fact, and growers buy more than half of its molasses production for fertilizer at a reasonable price. This liberal principle could be well extended by other mill areas for the benefit of the district.

The analysis of molasses shows that the nitrogen and potash content are reasonably high but that the phosphate content is low. Other important factors are the amount of minor or trace elements that molasses contains, and its ameliorating effect on soil structure.

The amount of nitrogen, phosphate, and potash present in molasses varies both in season and mill area, but one analysis in 1949 reveals that a six-ton application of a medium quality molasses would supply approximately the following fertilizer equivalent as calculated from the chemical analysis of the sample obtained:

470 lb. sulphate of ammonia
102 lb. superphosphate
408 lb. potash.

The comparative figures for four cwt. of Sugar Bureau No. 3 Ratooning Mixture are:

101 lb. sulphate of ammonia
145 lb. superphosphate
168 lb. potash.

The analysis figures are liable to be misleading as the most important point is the availability of these plant foods.

Observations in Mackay since 1949 and especially during the last two years have shown that:—

Fig. 33—Cane on left had six tons of molasses per acre, and that on right six tons molasses plus two bags sulphate of ammonia.

(1) In some cases, depending on seasonal conditions, the response from molasses, while evident in the first crop following application, does not appear to be as great as in the second and third crop following that particular application; no other fertilizer but sulphate of ammonia is applied to subsequent ratoon crops.

A block of Q.50 treated with molasses at the rate of six tons per acre in 1952 yielded 20 tons per acre harvested as first ratoon in September, 1953, and 37 tons per acre harvested as second ratoon in July/August, 1954. Both received two bags per acre of sulphate of ammonia. In one instance, following an application of molasses on young first ratoons, the subsequent four ratoon crops harvested were good.

(2) The addition of from one to two bags per acre of sulphate of ammonia as a topdressing following the molasses application will give better results than the molasses alone.

During 1952 a small topdressing of sulphate of ammonia on a molasses treated area was shown to give better results than from molasses alone. Following these results six tons of molasses per acre was applied to a field of Q.50 immediately after harvesting the plant crop in July, 1953. The block was disced both ways and harrowed with harrows upside down to cover the molasses immediately following the application. This area received 4½ inches of rain at the end of August. Sulphate of ammonia was applied at the rate of two bags per acre to six row strips through the block in December, 1953, and the other six row sections were not treated.

A portion of this treatment was photographed (Fig. 33) in August, 1954, when it was estimated that there was a difference of 15 tons per acre in crop between the areas which received the extra nitrogen and those which did not. The difference is more evident inside the block away from the headland; thickness of stalk, size of stool, length of cane, cover and general appearance are superior on those strips which received sulphate of ammonia.

Bureau fertilizer trials have established that cane yields are influenced by the proportion of nitrogen to potash available to a crop. Individual growers apply molasses on areas up to 100 acres per year at the rate of six tons or 1,000 gallons per acre, and as much as 6,000 to 8,000 gallons per day have been delivered and applied to fields towards the end of the crushing.

A 500 gallon tank with two branches controlled by separate valves is used for applying the molasses, and hydraulic lifts on motor vehicles ensure delivery of all of the molasses.

The cumulative effect of molasses application is indicated by the results of soil analysis from a farm at Mirani. During October, 1953, samples were obtained and analysis revealed the benefit of molasses on what was originally one of the poorer blocks of the farm. Two blocks were sampled:—

(1) The original poor block which had received molasses only at the rate of six tons per acre in 1949 and again in 1952, and (2) a better block which had never received molasses, but fertilizer only.

No. 1 was very well supplied with potash, while the phosphate content was good, and it was recommended that a dressing of Sugar Bureau No. 2 at the rate of 2 cwt. per acre should maintain these two plant foods at their present satisfactory level. No. 2 had a good phosphate content but the potash con-

tent was low, indicating a need for a high potash mixture on that soil.

Apparently the original phosphate status of both soils was reasonable. The recommendation was made that since No. 1 had a high potash content and would probably not respond to further potash applications, it would be advisable to apply molasses to No. 2 field which was deficient in potash.

A number of individual growers from two mill areas in the Mackay district have proved that sulphate of ammonia as a topdressing with molasses is an economic proposition and does increase considerably the returns from molasses applications. It is considered this practice will extend in the central area on those properties where molasses is applied.

An Improved Culture for the Inoculation of Green Manure Crops

For many years now, the Bureau has been supplying to farmers cultures for the inoculation of seed of green manure crops. An increasing number of farmers is realizing the benefits derived from treating their legume seed, but there are many others who have never treated seed, and so are not getting full value from the cover crop. Leguminous plants inoculated with the right strain or plant, or from other laboratories. In the latest trial, a strain was found which was somewhat superior to the one previously sent out to farmers; it will now become the standard strain and will remain so until a better one is found.

Since an improved strain is now available, it is suggested that all farmers should inoculate their current planting

Fig. 34—Variation in ability to fix nitrogen. Nos. 1, 2, 3 and 4 have been inoculated with different strains, while No. 9 is an uninoculated control.

"variety" of nitrogen-fixing bacteria—there are many strains of this bacteria just as there are many different varieties of cane—produce numerous nodules on their roots, and by this means the plants can obtain their supplies of nitrogen from the air instead of from the soil. The strains of bacteria vary in their ability to obtain or fix nitrogen (see Fig. 34) and, from time to time, small-scale trials are held to test any new cultures of the bacteria which the Bureau might have acquired either by isolation from a vigorous well-nodulated of green manure, whether it be a cowpea, velvet bean or mung bean crop. The service is free, and all that needs to be done is to write to "The Director, Bureau of Sugar Experiment Stations, William Street, Brisbane," at least a fortnight before the proposed date of planting, stating the quantity and type of legume to be used, and approximate date of planting. Full instructions are sent with the culture, which will keep for a month should planting be delayed for some reason.

—B.T.E.

Meringa Field Day—19th May, 1954

ADDRESS BY G. WILSON

The entomological staff at Meringa are conducting field experiments to find out if the economic side of grub control can be improved. The methods and quantities of BHC applications are still kept under observation for both greyback and frenchi grub control, and any conclusions arrived at that will improve the economy or efficiency of grub control will be passed on to the growers.

A number of powerful new insecticides have been developed since the discovery of BHC and these are being tested in as far as they are applicable to pests of sugar cane. One of these new poisons has been very successfully used in the soil against grubs of different species which occur in other countries, and it so happens that this poison is relatively cheap and could compete with BHC if it can be found to control our cane grub species to an equal degree. This insecticide has been put into field trials against greyback and frenchi grubs on various farms from Mossman to Innisfail and is also on trial, along with other new insecticides, in Tully, where the pest being studied is the funnel-nest ant. This small ant makes tunnels many feet deep throughout the soil. It builds conical heaps of sand grains up to a foot high on the surface of the soil, and its activities stunt the growth of sugar cane.

The chief purpose of our continued interest in grub control is to ensure maximum efficiency with greatest economy. It is worth mentioning that our field experiments have been greatly hampered by lack of suitably heavy grub infestations. In each field where we are experimenting we leave several small plots, about a thirtieth of an acre each, without any insecticide, so that grubs can hatch and develop there to show what severity of attack is taking place in the experimental plots. We find that in recent years there has rarely been sufficient greyback beetle flight in the district to supply the grub population that we require to test out the new poisons. The amount of grubs encountered is just sufficient to make it essential to maintain BHC applications. Light frenchi populations still found in Mulgrave and greyback populations in Innisfail would very rapidly build up if applications were discontinued.

The present steadying down of grub populations, however, suggests that growers should carefully examine the way in which they use BHC and the total amount they use on a field from the plant crop until the final ratoon is ploughed out. Grub damage was so serious a few years ago and BHC so remarkably successful, that a proportion of growers were inclined to overdo the use of BHC by applying every year sufficient to give protection for two or three years. The Bureau's recommendations are now well known. Each farmer should apply them on his own farm in such a manner as to obtain protection of his crop without needlessly high cost.

The entomologist's activities are not confined to studying the use of poisons against grubs and ants. One of the most important developments in recent years is the discovery of ratoon stunting disease and the heat treatment of cane to supply healthy plants. It is a most natural question to ask, whether the healthy crops will become reinfected by some natural carrier of the disease. Virus diseases such as these are often carried by insects which suck the juices of plants and carry the disease in their bodies from plant to plant. There are in North Queensland two important virus diseases of cane, ratoon stunting and chlorotic streak. The entomologists are engaged in testing the sap-sucking insects that are found on cane to detect whether any of them could spread either of these diseases. So far no insect has been found to carry the diseases but definite negative conclusions can not be arrived at without a considerably greater amount of study. If the natural means of transmission of a disease by insect or otherwise can be discovered this knowledge can be used to improve

the control of the disease and so lessen the danger of reinfection of healthy crops. The final result aimed at is a contribution to farm economy, by the elimination of loss from disease and the lowering of the overall cost of maintaining supplies of healthy plants.

ADDRESS BY J. H. BUZACOTT

"THE INTELLIGENT USE OF CANE VARIETIES"

Cane growers in the mill areas of far North Queensland are fortunate in having a relatively large number of varieties to choose from in formulating their planting programme. However, they do not always give the matter of choosing the correct varieties to suit their farms the attention which it warrants. For instance, growers have been known to plant Q.50 on river flats with disastrous results; other growers have suffered serious losses through the planting of Q.44 on dry soils to which the variety is quite unsuited, whilst a few have persisted in trying to grow Badila on soils which are too poor for this variety.

The choice of varieties with which to plant one's farm warrants very careful consideration. Firstly, it cannot be too strongly emphasised that every farm should have two or preferably more varieties represented. It has happened before and can happen again that a serious disease may cause the loss of a variety to a district. If such a variety should happen to be the only one which a farmer grows, naturally he may experience considerable hardship in having to change over suddenly to other varieties with which he is unfamiliar.

When deciding on a planting programme it is wise to choose one or two varieties that normally perform well on the particular soil type involved. At least one variety with a good sugar content early in the season should be planted whilst it is very wise also to select a further variety which will hold its sugar well late in the season. In this way a balanced harvesting programme is ensured. How often we see a farmer trying to pass his gang on to someone else because he has no early cane to harvest, whilst another farmer will endeavour to have his whole crop harvested by the end of October because he has no late variety on the farm!

It is not intended to describe the characteristics of all the varieties on the approved lists. Advice regarding their habits and their suitability to any particular soil type can always be obtained from officers of the local Sugar Experiment Station. There are, however, certain principles involved. It is wise, for instance, to harvest a free-arrowing variety early in the season, whilst varieties which are subject to red rot or rind disease should not be left till the end of the season to harvest. Particular blocks on the farm, such as low pockets or dry sandy ridges, often warrant a special variety.

A few years ago cane breeders were trying their utmost to develop varieties with higher sugar early in the season. This goal has now been attained with the result that several new varieties, which have good early sugar are undergoing propagation. Such is the constantly changing programme of the cane breeder that they are now seeking varieties with good late sugar as there is an indication that the industry urgently requires varieties that hold a high sugar content until January or later.

Due to the attainment of the increased sugar target by the industry at a much earlier date than was originally considered possible, some restriction in tonnage would appear to be inevitable. The agriculturists of the industry are to some extent to blame for bringing this about. It has been their objective to show the canegrowers how to produce twice as much cane on the same area. In the face of restrictions the growers aim should be to produce the same amount of cane on half the area. This would result in cheaper production and hence more profit to the farmer. It would also give an opportunity for a greater portion of the sadly overworked soil to have a well-deserved rest each year.

Copper Deficiency in the Central Area

Little is known about the function of copper in plants. The content of this element in the cane plant is very low, about .001 per cent. of dry weight.

Fig. 35—The result of copper deficiency on Q.50 plant cane at Mt. Pelion, 1954.

The Mt. Pelion-Mt. Ossa area is one portion of the Mackay district where copper deficiency is liable to occur in land cultivated to cane.

Fig. 35 shows the effects of copper deficiency on plant Q.50 at Mt. Pelion August, 1954, while Fig. 36 shows in the foreground copper deficiency at Mt. Ossa in plant Q.50 in 1950. In the background is normal cane.

A trial originally set out in November, 1949, proved conclusively that the application of 55 lb. per acre of copper sulphate would correct this deficiency and produce normal crops. The recovery of cane exhibiting this deficiency following an application of copper sulphate is amazing, and the effects are long lasting.

—C.G.S.

Fig. 36—Copper deficiency at Mt. Ossa in Q.50 plant cane in 1950; in the background is normal cane.

The Bundaberg Sugar Experiment Station

The Bundaberg Station is the headquarters of the Bureau's field activities in Southern Queensland. It is, in addition, the headquarters of a number of the Mill Technology staff. In recent years the numerical strength of the staff has increased to such a degree that extension of the laboratory-office building became a matter of urgency.

Accordingly, plans and specifications were prepared by an architect, and a contract let early in the present year. The addition provided three further offices and the extra space thus obtained will provide for requirements for a considerable time. The architects, in designing the additions, managed to re-cast the very plain roof and frontage

which characterised the old building. The finished job is attractive, besides being well lighted and ventilated.

The original building was erected in 1925, and incorporated, at that time, facilities for juice analysis as well as a laboratory for the then resident entomologist. In 1934 the entomological activities were transferred to Meringa, and the space was utilised for the equipping of a soils laboratory. The latter was taken over in 1951 by members of the Mill Technology Division and in the last year all juice analysis work has been carried out in a separate building. The new extensions add considerably to the space previously available.

This is the first unit of the original chain of Experiment Station buildings to be extended to cope with present day requirements. A contract has been let for building remodelling at Meringa to solve a similar problem and this will be completed within a month or so.

—N.J.K.

Fig. 37—View of the original office building before alteration.

Fig. 38—The extended and remodelled building.

A Visitor from Madagascar

By C. G. HUGHES

In April of this year, Professor A. D. Ross, Honorary Secretary of the Pan Indian Ocean Science Association, which had arranged a Congress to be held in Perth in August, wrote to the Director of the Bureau saying that he had received a query as to the feasibility of one of the delegates seeing the Queensland sugar industry before he attended the sittings of the Congress. Further correspondence ensued and on Monday, 26th July, Monsieur M. H. Barat arrived in Brisbane, having left Madagascar only three days before. M. Barat is Director of the Laboratory of Phytopathology at Tananarive, Madagascar, and as such is responsible for all disease research and control in a wide range of tropical crops. His interests include coffee, pepper, vanilla, cloves and, most importantly, sugar cane. He states that Madgascar with its population of four and a half million, most of whom are of Malay or Polynesian origin, is not self-supporting in sugar and imports a considerable amount. Present production is only 25,000 tons per annum, but a new mill and plantation now in process of development will bring the total to 75,000 tons and further expansion is planned for the near future.

The administration of Madagascar is in the hands of the French, who number 60,000, with half of them in Tananarive the capital, but the sugar industry is part French company production and part peasant. Many of the farms are poorly managed and mechanization is almost unknown; most of the cultural processes are primitive and some habits, such as the harvesting of a field by removal of large stalks only, do not tend to efficiency in production. It was partly the desire to learn something of the mechanization in the Queensland industry and partly his interests as a professional plant pathologist which brought M. Barat to this State. A recently discovered outbreak of Fiji disease in Madagascar is of particular concern to him and he plans to have 30 to 40 inspectors working through the fields inspecting and roguing diseased stools on the pattern so successfully followed in Queensland.

Discussions with Bureau officers and a brief visit to the Pathology Farm at Eight Mile Plains took up two days and then on Wednesday, 29th July,

Fig. 39—Monsieur M. H. Barat, a plant pathologist from Madagascar examining the symptoms of ratoon stunting disease in a Queensland cane field.

M. Barat, accompanied by the writer, flew to Bundaberg. Highlights of the two days there were an inspection of the Experiment Station and representative parts of the district, an examination of the agricultural machinery made by a local firm and discussions with members and the supervisor of the Bundaberg Cane Pest and Disease Control Board. M. Barat was particularly interested to learn of the efforts of the local Board which, in co-operation with

the Bureau, was responsible for reducing the threat to the industry from Fiji disease to such an extent that not a single affected stool was found anywhere in the district during the 1953-54 growing season. The Cairns district was next on the itinerary and there ratoon stunting disease was seen in commercial plantings and in experimental trials. The hot-water treatment tanks at Mulgrave and Babinda were seen in operation and both Babinda and Innisfail districts showed that all their rain did not fall in the wet season. Returning southwards, M. Barat was in the hands of Mr. C. G. Story at Mackay for a few days, and again saw ratoon stunting disease and agricultural implements. A short stay in Brisbane and another visit to the Pathology Farm preceded a trip to the Northern Rivers district of New South Wales, where Fiji disease is still a problem, then back to Perth for the opening of the Congress on 17th August with a short stop en route at Sydney.

We were delighted to have such a knowledgeable pathologist and agriculturalist as M. Barat visit us and see our Queensland industry and we only hope that his trip through this State was both enjoyable and profitable.

Random Gleanings

The Cane Growers' Quarterly Bulletin came into being with the July, 1933, issue—a little more than 21 years ago. It has appeared, and been posted free to every cane grower and miller in the State, every three months since that date with the exception of a period between 1942 and 1946; wartime paper shortage caused a temporary cessation at that time. Over half a million copies have been posted in the 21 years. We would not like to calculate how many words have been written by Bureau staff for the Bulletin in that period.

Inkerman mill and district established some new Australian records in its 1953 crop. It crushed the largest tonnage ever handled by a single milling train in this country—455,449 tons. In addition the production of sugar was at the rate of 6.52 tons per acre. Since the average age of cane at harvest probably does not exceed 15 months the production may be stated at 974 lb. of sugar per acre per month of growing season. The average for the State in that year was about 586 lb.

Some weaknesses in hot water treatment tanks for the control of ratoon stunting disease have become apparent in recent months. The success of the treatment depends on correct temperature for the correct time. It has been found by precise temperature measurement that the temperature rises too slowly in bags of plants after initial immersion. This is due to inefficient circulation of the surrounding hot water. Most Boards, acting on Bureau advice, have now changed over from bags to wire baskets and have installed circulation pumps on the tanks. With the old method—jute bags and no pump—some of the treated plants were not cured and the resulting crop was not free of disease.

Here is a new tip in treating cane with Aretan or other mercurials to improve germination. In the Babinda-Innisfail districts the stick-in-drill planting method does not lend itself to dipping or spraying with these chemical solutions. Tests have been made spraying the setts lying in the drills but the results were not promising. Other tests showed that a big improvement in germination was obtained if the stripped cane, before cutting down, were sprayed with a knapsack spray of mercurial solution. Apparently sufficient material is absorbed—despite subsequent handling—to improve the speed of germination of the plants. Stalks should be sprayed on both sides.

With the financial year just concluded and the compilation of figures for the Annual Report in hand it was noted that the number of samples of various kinds analysed by the Brisbane Laboratory of the Bureau was the highest yet recorded. The installation of the latest type of flame photometer for the determination of potash has been of considerable value in this respect and the time for such an estimation has been reduced from a matter of several hours to a few minutes. In fact the longest part of the analysis is now the preparation and the leaching of the sample. It is pleasing to record that growers are enthusiastically taking advantage of this stepped up soil testing service and it is hoped that in the coming year the number of samples will be still further increased.

A recent enquiry from a grower raised a point of some interest. The query concerned the fertilizer requirements of a field producing good tonnages of cane. The analysis of the soil indicated that a very good supply of phosphate and potash was present. It was therefore possible to advise the grower that he could reduce his production costs considerably by refraining from using any of these two plant food materials providing, of course, that he did not pursue such a course indefinitely. It was pointed out that by having his soil regularly analysed a constant check could be kept on the fertility status of the field. Such a soil testing service is provided free to any grower who desires it.

The search for new canes proceeds uninterruptedly. There is a steady stream of overseas varieties reaching the Bureau's quarantine house each year. During the past twelve months a total of 29 canes never previously grown in Queensland has been received from Barbados, United States of America, Mauritius, South Africa, India, Hawaii and Fiji. Some of these will be tested for their commercial value; others will be used specifically for breeding.

Mr. L. R. Brain, member of the Bureau's Mill Technology Division, is at present in South Africa. He is gaining experience of the research operations of the Natal Sugar Milling Research Institute and will also study manufacturing methods used in that country. Before returning to Australia towards the end of the year he will spend some weeks in Mauritius sugar factories.

Plans are under consideration for a new office-laboratory building at the Mackay Sugar Experiment Station. The existing structure has a history as long as the Bureau itself. It was the first building at The Lagoons when the Mackay Station was established in 1900, and was subsequently moved to Te Kowai in 1935 when the present Station began operations. Proposals to increase the staff and to improve services make necessary more modern accommodation.

A conference was recently held in Adelaide under the auspices of the C.S. and I.R.O. to discuss Weed Control. This conference was the first of its kind to be held in Australia, although the use of modern weed killing chemicals has been widespread in all States for some years. In view of the large amount of work of this nature carried out in the sugar areas the Bureau was invited to send a delegate and advantage was taken of this offer. The discussions that took place regarding the present search for newer and even more effective chemicals were of particular interest, and the possibilities and difficulties in this respect were outlined by the technical representatives of the various chemical manufacturers present. Undoubtedly there is intense activity by large overseas companies. Of immediate practical interest was the concern of all delegates regarding the unsatisfactory nature of much of the available spraying equipment. This is particularly the case with nozzles, and an effort is to be made to induce manufacturers to supply nozzles with standardised characteristics of volume and coverage.

The action of the Department of Agriculture and Stock in stationing a Soil Conservation officer at Bundaberg should be a matter of satisfaction to many cane farmers of that district. It is certainly an action that is greatly welcomed by the Bureau. Many growers will recall the first erosion control experiment set out on a Childers hillside back in 1946. The behaviour of the terraces and waterways of this trial provided much useful information and was of considerable interest to the surrounding growers. Undoubtedly it gave them some hope and encouragement in their battle with the insidious loss of soil that was occurring on their farms. With the formation of the Soil Conservation Branch of the Department of Agriculture and Stock in 1948 further work has been carried out and many worthwhile control schemes have now been instituted by that Branch in co-operation with Bureau staff and district cane growers. In the past two to three years some 60 layouts have been put into operation in the Bundaberg - Isis - Maryborough area. This speaks for itself and many farmers are finding that contour planting does not create any serious difficulties in cultivation, harvesting and tramming. In fact rather the reverse is the case. Growers requiring information in this respect are advised to address an enquiry to the Soil Conservation Officer, Department of Agriculture and Stock, Bundaberg.

The Bureau is interesting itself in a new outlet for molasses and bagasse. The bagasse, after disintegration in a hammer mill or similar device, is mixed with molasses. In the proportions of four of molasses to one of bagasse the mixture is dry and crumbly and could be transported in bags for use as a stock food. Arrangements are being made for feeding trials to be carried out by the Department of Agriculture and Stock.

Cane collecting in New Guinea did not end with the 1951 Bureau exp tion. Local officials, with whom con was made in that year, have s ce forwarded 19 more varieties. When the Bureau heard recently that some C.S.I.R.O. officials were visiting the territory on a land use survey a request was made that they forward any promising sugar cane material they encountered. Already five canes have been received from them by air freight.

The bagasse trial on Mac a Experiment Station is already showing promising results; the plant crop wi be harvested this year. Should this a subsequent crops show an econom gain the growers will have available a much needed soil improving material. The physical condition of Mackay's heavy soils could do with some improvement. If bagasse is found to be of benefit, then both better drainage and tilth should result.

The Bureau's cane breeders at Meringa will, during the coming summer, begin a project of breeding green manure crops. Wilt and bean-fly are very destructive on most of the cowpea types of green manures, and an endeavour will be made to produce resistant strains. At the same time some cross breeding will be conducted among the various velvet bean varieties we possess, with a view to producing some with even better qualities.

Losses from Ratoon Stunting Disease

Some years ago the Bureau established the first comparative plantings of diseased and healthy Q.28 with a view to measuring the yield losses caused by ratoon stunting disease. But it was not until 1953 that a series of such trials was laid down with a range of our important commercial varieties. By that time the curative hot-water treatment had been discovered and it was possible to plant treated (and therefore healthy) cane alongside the non-treated (diseased) cane of the same variety.

Now, in 1954, the plant crops of these trials are being harvested and the results present an interesting picture. Before harvesting, a considerable amount of data was collected on stalks per stool, diameter of stalks and length of millable cane; these will be used in conjunction with the plot yields to determine whether the yield loss is associated with all three factors.

Only two of the trials have been cut so far and these show a big loss from the disease with Trojan in the Mulgrave area, and serious losses with both Q.50 and Pindar in the Bundaberg district. The results of all trials will be given in a later issue of the Quarterly Bulletin.

A surprising feature of the two experiments mentioned above is that losses should have been so great in plant cane in a good year. Ratoon stunting disease is known to affect yields more severely in ratoon crops and in dry seasons. It is certainly disconcerting to consider that many of the "good" crops in these districts this year are actually diseased and would have been yielding five to ten tons per acre heavier if the crops were healthy.

—N.J.K.

Forecast of Approved Varieties for 1955

In accordance with usual practice, the Bureau has prepared a forecast of the changes it is proposed to make in the approved variety list of 1954. Any interested farmers' organizations which consider alterations should not be made along the lines indicated, or wish to submit any other changes, are invited to submit their views to the Director of Sugar Experiment Stations before 30th November, 1954. **Any objections against varietal deletions or suggestions for additions must be accompanied by a detailed statement of the reasons for such objections or suggestions.** No action can be taken in respect of late or unsubstantiated requests.

Mossman — Clark's Seedling to be deleted. Q.57 to be added.

Hambledon—Q.57 to be added.

Mulgrave—Eros to be deleted. Q.57 to be added.

Babinda—Cato and Eros to be deleted. Q.57 to be added.

Tully—Vidar to be added.

Invicta (Inkerman district)—Q.57 to be added.

Proserpine—E.K.28, M.1900 Seedling and P.O.J.2878 to be deleted.

Cattle Creek—E.K.28, M.1900 Seedling, Badila Seedling, Co.290 and P.O.J. 2725 to be deleted. Q.58 to be added.

Racecourse — M.1900 Seedling and Badila Seedling to be deleted. Q.58 to be added.

Farleigh—E.K.28, M.1900 Seedling, Badila Seedling, Co.290 and S.J.2 to be deleted. Q.58 to be added.

North Eton—E.K.28, M.1900 Seedling, Badila Seedling, P.O.J.2725 and Clark's Seedling to be deleted. Q.58 to be added.

Marian—E.K.28, M.1900 Seedling and Badila Seedling to be deleted. Q.58 to be added.

Pleystowe—E.K.28, M.1900 Seedling, Badila Seedling, Co.290, P.O.J.2725, S.J.2 and Clark's Seedling to be deleted. Q.58 to be added.

Plane Creek—E.K.28, M.1900 Seedling, Badila Seedling and Co.290 to be deleted. Q.58 to be added.

Qunaba—Co.290 and Q.49 to be deleted. N.Co.310 and Vesta to be added.

Millaquin—Co.290 to be deleted. N.Co. 310 and Vesta to be added.

Bingera—Q.25 to be deleted. N.Co.310 to be added.

Fairymead—N.Co.310 and Vesta to be added.

Gin Gin—Co.290 and M.1900 Seedling to be deleted. N.Co.310 to be added.

Isis—Co.290 and Q.42 to be deleted. N.Co.310 and Vesta to be added.

Maryborough—M.1900 Seedling and P.O.J.213 to be deleted.

Moreton—N.Co.310 to be added.

Rocky Point—Co.290, P.O.J.2878, Q.49 and Q.813 to be deleted. Pindar to be added.